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Class I, HEXAPODA.

Order XI, ORTHOPTERA.

THE CYRTOPHYLLI OF THE UNITED STATES.

By A. N. Caudell,

Washington, D. C.

(Plate I.)

The members of the group Cyrtophylli, generally known as true Katydids, are rarely numerously represented in collections, though at times they are rather common in some localities. The nights may resound with the song of the males and yet the listener never see one of the songsters. This is accounted for by the habitat of the insect, which is in the tallest trees available. In the vicinity of Washington they live in tall trees in the woods, thus escaping notice by the greater number of people. In some localities they are numerous and, in the absence of large trees, live in orchards and shrubbery. In such localities they are no rarity to the farmer or fruit grower but in places where large trees abound one may live a life time and rarely see one, though often hearing the stridulations of the male. The sound made by these insects is the loudest made by any orthopterous songster known, being indeed, unsurpassed by any insect of any order except the Cicada, or harvest fly. The song of the common species, *perspicillatus*, consists of a rasping note repeated from two to five times, usually three, followed by a short pause. The same species seems to vary its song from time to time, sometimes the note being repeated but twice and again as many as five times, the number probably depending upon the vigor of the insect as well as upon the temperature. The number is said to vary quite regularly in the number of beats per minute according to whether the temperature is higher or lower. The number per minute at a temperature of 82° is said to be about 89 while at 58° it is but 15 to 20. The notes have a fancied resemblance to the words "Katy-did," or "Katy-did, she-did."

The female of these insects, at least that of the common species, *perspicillatus*, is unique among Orthopterous insects, so far as known, in that they stridulate in a manner similar to that of the males. The elytra are partially opened and closed just as are those of the males during stridulation. The roughened surface of the triangular anal areas rub over each other, like the tympani of the males, the right elytron sliding beneath the left one. The resulting sound is a sharp scraping note heard easily for several yards. This sound is made by the female when disturbed by handling but whether or not it is ever made voluntarily in nature is not known, but it presumably is when the insect is disturbed by any cause. Not enough study has been given the various species of these interesting insects in nature to admit of their separation on song and habit. But little is recorded regarding their breeding habits. Jaeger, Life of North American Insects, p. 108, says the female oviposits in the soil but his observations, which are also given by Lord in Science Gossip for July, 1865, must have been faulty as the eggs are quite surely deposited in crevices in the bark of trees. Professor Riley secured eggs from a female in captivity. They were inserted into a piece of cork and some into crannies in the breeding cage. On October first of last year Mr. Barber secured a female of *perspicillatus* ovipositing by night on Plummers Island, Md. The ovipositor was inserted into the bark of a small Elm tree a few feet above the ground. This is probably not the usual place of oviposition, the eggs more likely being inserted into the bark of large trees some considerable distance from the ground. The young feed on the leaves and very probably rarely or never leave the shelter of the tree upon which they were born. They mature in July and live till killed by the coming of cold weather. In the vicinity of Washington the males commence stridulating in the latter part of July and continue till about the first of October, rarely later.

The song is heard from dark to nearly daylight throughout August and well into September. But as the nights grow cooler they stop earlier and the survivers that live to sound their note after the middle of October rarely do so at night, the notes being feeble and made during the afternoon. Mr. Barber has heard the note of *perspicillatus* as late as the first week in November. But evidently very few individuals live that late in the latitude of Washington.

Considerable doubt exists as to whether or not these insects ever fly. I have repeatedly endeavored to persuade specimens to fly, but without success. Both Mr. Barber and I have succeeded in getting specimens to spread the wings and sail to the ground, alighting with a thud, but no attempt was made by the insects towards actual flight. They probably soar from one tree to another after the manner of the flying-squirrel. They may also at times actually fly as Mr. McAtee claims to have seen a "katy-did with round wings" flying about the tops of tall trees on Plummers Island, Maryland. The elytra were held rigid while the insect was in flight, like those of *Coleoptera*. But, being at such a height above the observer, accurate observations were necessarily difficult and error may have resulted.

Five nominal species of this group have been recorded from the United States, *C. perspicillatus* Fabr., *concavus* Harr., *zimmermanni* Sauss., *hypericifolius* Stoll, and *floridensis* Beutenm. Eliminating certain of these through synonomy or being erroneously referred to our fauna and adding three new species we have six species referable to three genera. These genera may be separated as follows:

Pronotum scarcely longer than the middle width, the lateral lobes quadrate or higher than long; supraanal plate of the female no more than twice as long as the middle width, apically broadly rounded or subtruncate.

Anterior tibiæ spined above; pronotum subtruncate posteriorly, the lateral carinæ subpersistent; posterior femora with about ten spines below on the outer carina; supraanal plate of both sexes convex above on the basal two thirds and longitudinally sulcate; cerci of male with the branches parallel, the tips no farther apart than the length of the lower branch.....**Paracyrtophyllus.**

Anterior tibiæ unarmed above; pronotum posteriorly rounded or subangulate, the lateral carinæ not indicated anterior of the principal sulcus; posterior femora with about five or six spines on the outer carina below; supraanal plate of both sexes concave above on the basal fourth only or nearly wholly flat; cerci of the male with the branches divergent, the tips further separated than the length of the lower branch..................................**Cyrtophyllus.**

Pronotum considerably longer than the middle breadth, the lateral lobes decidedly longer than high; supraanal plate of the female more than twice as long as the middle width, apically narrowly rounded ....**Lea.**

Genus PARACYRTOPHYLLUS, new.

Color green. Head short, broad; interocular space about four times as broad as one of the eyes; vertex dorsally sulcate, very narrow, about one half as broad basally as one of the eyes, acute with the sides straight. Antennæ long and slender, nearly twice as long as the body, including the wings, the basal segment much enlarged; antennary scrobes laminate on the inner side, as long as the vertex; eyes subglobose, small but prominent. Prothorax short, broad and stout, the disk granulous or rugose, nearly flat and crosses by two transverse sulci, usually fairly distinct but sometimes more faint, the posterior one generally the more distinct and situated about the middle, the anterior one, sometimes quite indistinct, cutting the anterior half about the middle; posterior margin of the pronotal disk subtruncate; lateral lobes vertical, subquadrate or slightly higher than broad, the lower and anterior margins straight, the posterior margin straight below, inclining slightly backwards above; lateral carinæ persistent, usually obscured near the anterior border of the pronotum; pro-, meso- and metasterni each armed with a pair of quite long sharp spines, those of the prosternum cylindrical, the others more or less triangular. Abdomen heavy, one of the segments near the base tuberculate above in the male and the penultimate segment in the same sex is very broad and somewhat flaring; supraanal plate convex and longitudinally sulcate above on at least the basal two thirds, but little longer than broad in either sex, apically broadly rounded, sometimes subtruncate; subgenital plate of the male prominently produced as a long flattened slightly tapering blade, dorsally concave and cleft in the apical third, the two branches more or less connate. Ovipositor a broad slightly curved blade, about two times as long as the pronotum, slightly broadened mesially and apically quite abruptly pointed, subapically armed on each side with two or three short transverse ridges and very finely and dully serrate below on the apical fourth or less; the central portion of the ovipositor is so thin as to be translucid but the tip and both margins are thickened and opaque. Cerci of female rounded, pointed, the tips obscurely and briefly furcate; of male angular and forked, the branches parallel (Fig. 6). Elytra very broad, and usually convex giving the insect a very rotund appearance, the basal half or more of the costal area in the male is subhyaline with conspicuous parallel transverse veins and the speculum is exceedingly well developed (Fig. 1); wings ample, considerably shorter than the elytra. Legs slender, weak; anterior tibiæ with slit-like foramina present on both sides, hind femora about three and one half times as long as the pronotum, moderately swollen on the basal half or three fifths, armed below on the outer carina with ten short stout spines; middle and anterior femora armed on both margins below with several spines on the outer carinæ of the middle ones and the inner carinæ of the anterior ones * the opposite carinæ with but three or four spines, sometimes but one or two. Tibiæ flattened above with acute margins, the anterior pair armed above on the outer carina with half a dozen stout spines, none apical, the inner carina unarmed or with but one or two minute spines; middle and posterior tibiæ armed above and below on both sides with a number of spines.

Type: *P. robustus* Caudell.

The description of this genus has been made in full as those of the following ones are somewhat comparative with it.

The measurements given in this paper are made as follows: Width of elytra is at the widest point. Length of the ovipositor, and of the subgenital plate of the male the measurement is from the extreme ventral base direct to the tip. Width of the subgenital plate of the male is the width at the widest point of that portion projecting beyond the tip of the body. Width of the pronotum is the width at the broadest point, always across the posterior part. Width of ovipositor is the width at the widest point beyond the body.

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* In descriptive entomology confusion is liable when mention of the outer or inner side of the anterior legs is made, when in a natural position the inner side of the anterior femur is really the outer side when corellately considered. For the sake of convenience the legs are always considered as being in a natural position when being described, that is the posterior and intermediate ones directed backwards and the anterior ones directed forwards.

Paracyrtophyllus robustus, new species (Pl. I, figs. 1 and 6).

Robust; thorax heavy and broad, disk flat, considerably elevated in the posterior third, less so in the female; transverse sulci moderately distinct, the anterior one less so; lateral carinæ persistent and moderately acute, usually somewhat obscured in front of the anterior transverse sulcus. Elytra about twice as long as broad in the female, in the male about one and one half times as long as broad; wings considerably shorter than the elytra. Supraanal plate of both sexes convex above on the basal two thirds or three fourths and longitudinally sulcate, the apical portion flattened and apically broadly rounded or sometimes subtruncate; subgenital plate of the male longer than the thorax, slightly and gradually tapering, the tip split, the two parts distinct and apically subcompressed; cerci of the female slightly broader than thick, about five times as long as the basal width, somewhat incurved and apically incised; that of the male divided into two long parallel branches, incurved apically, the lower branch with about the apical half bent inwards and backwards (Fig. 6). Ovipositor broad and about two and one half times as long as the length of the thorax.

Length, pronotum, male, 6–7; female, 6–7; elytra, male, 28–29; female, 28–30; posterior femora, male, 22–23; female, 22–25; subgenital plate, male, 13; ovipositor, 17 mm. Width, pronotum, male, 8.5; female, 8–9; elytra, male, 19; female, 14–16; subgenital plate, male, 2.25–2.5; ovipositor, 3.5–3.75 mm.

Type no. 9143, U. S. National Museum.

Five specimens are before me, three males and two females, all from Texas without definite locality except one female, the largest specimen, which is from Tiger Mills. Other specimens are in the Scudder collection at Cambridge, Mass.

The broader thorax with its more distinct lateral carinæ, the dorsally armed anterior tibiæ and the shorter elytra and wings make this insect easily distinguishable from related forms. The song and habits are very probably similar to those of the species belonging to the following genus. I had thought to construe the *Cyrtophyllus perspicillatus* of Fabr., to be this form but was prohibited from doing so by the pronotum of his species being described as posteriorly rounded, which is not true of this species.

Genus CYRTOPHYLLUS Burmeister.

Cyrtophyllus Burm. Handb. Ent., II, 697 (1838).

Superficially closely resembling the previous genus but is readily distinguished from it by the general form, which is less robust, and by the distinctly more elongate elytra. Structurally there are a number of correlated characters separating this genus from its allies. Lateral carinæ of the pronotum distinct only behind the principal transverse sulcus and the posterior margin of the disk is more rounded, or sometimes subangulate. The anterior tibiæ are unarmed above and the posterior femoræ are armed below on the outer carina with but four or five spines, rarely six or seven. Supraanal plate in both sexes flat and nonsulcate above or convex and longitudinally sulcate only on the basal fourth or less. Cerci of the male with the forks divergent, the tips separated by a distance greater than the length of the lower branch. Ovipositor more than twice as long as the pronotum.

Type: *Locusta perspicillata* Fabricius.

The distinctness of this genus from the preceding one is undoubted, the separating characters being ample to make easy the differentiation of the two genera. Besides the characters enumerated above the subgenital plate of the male is differently shaped, being more hastate in *Cyrtophyllus*. The supraanal plate of the male of this genus is also different, being about as broad as long, while in *Paracyrtophyllus* it is longer than broad.

Brunner (Mon. Pseudophylliden) considers the genus *Chlorocœlus* of Bates a synonym of this genus. I very much doubt the correctness of this view as the insect described by Bates does not seem congeneric with the insect typical of *Cyrtophyllus*.

We have four species belonging to this genus. They may be separated by the following table:

Cerci of the male with the lower branch simple.
  Lower branch of the cerci of the male with the incurving apical portion scarcely as long as the less tapering basal portion; the cerci between the two branches less enlarged (Fig. 7); elytra of the female broadly rounded apically and the posterior margin usually as convex as the costal margin (Fig. 3).
    Larger; transverse sulci of the pronotum distinct, usually quite conspicuous; elytra of the female less elongate than in the alternating category. **perspicillatus.**
    Smaller; transverse sulci of the pronotum less distinct, usually inconspicuous; elytra of the female distinctly more elongate than in the alternate category..**elongatus.**
  Lower branch of the cerci of the male with the incurving apical portion as long as the thick, uniformly tapering basal portion, the cerci between the two branches much enlarged, forming a triangular projection (Fig. 8); elytra of the female narrowly rounded apically, the posterior margin almost straight (Fig. 2)...................... ....**intermedius.**
Cerci of the male with the lower branch conspicuously forked (Fig. 9)......**furcatus.**

Cyrtophyllus perspicillatus Fabricius (Pl. I, Figs. 3, 4, 7).

Locusta perspicillata Fabr., Ent. Syst., II, 36 (1793).
Cyrtophyllus perspicillatus Burm., Handb. Ent., ii, 697 (1838).
Pterophylla concava Harr., Encycl. Americana, viii, 42 (1835).
Cyrtophyllus zimmermanni Sauss., Rev. Mag. Zool., 1859, 206 (1859).
Cyrtophyllus concavus Scudd., Journ. Bost. Soc. Nat. Hist., 1862, 272 (1862).

Considerably less robust than *Paracyrtophyllus robustus*. Thorax usually a little longer than broad, sometimes quadrate, the disk transversely convex, longitudinally flat or sometimes considerably elevated posteriorly; the anterior margin straight, the posterior margin rounded or subangulate; transverse sulci, at least the anterior one, very distinct and well defined; lateral carinæ indicated only behind the principal sulcus and there usually quite rounded. Elytra broad and strongly concave, of the same structure as those of *P. robustus* but more elongate than those of that species, those of the female being about two and one half times as long as broad; wings ample, not as long as the elytra, but considerably longer than those of *P. robustus*. Supraanal plate of both sexes somewhat longer than broad, flat or nonsulcate or convex and longitudinally sulcate only in the basal fourth or little more, often more distinctly so in the female, apically broadly rounded or subtruncate; subgenital plate of the male two or more times as long as the pronotum, the projecting portion somewhat hastate, the two halves of the divided apex generally more or less connate; cerci of female round, six or seven times as long as the basal breadth and slightly curved upwards, the tip usually very inconspicuously notched; cerci of the male forked, the two branches divergent and incurved, the lower branch simple, with a minute subapical denticle on the lower side and usually a little shorter than the upper one, the incurving apical portion not quite as long as the scarcely tapering basal portion. Ovipositor three or more times as long as the pronotum, microscopically serrate below near the tip, the serrations sometimes very inconspicuous, armed laterally, as in *P. robustus*, with two or three short transverse subapical ridges.

Length, pronotum, male, 5.5–6; female, 5.5–6; elytra, male, 35–38; female, 37; posterior femora, male, 20–21.5; female, 20–23; subgenital plate, male, 12–14.5; ovipositor, 18–20 mm.; width, pronotum, male, 6–6.5; female, 6.25–6.5; elytra, male, 18–21, female, 16; subgenital plate, male, 2.5–2.75; ovipositor, 3.25 mm.

This species extends south to South Carolina, west to Kansas and north into Canada. I have specimens before me from Massachusetts, New York, New Jersey, Maryland, District of Columbia, North Carolina, Missouri, Kansas and Iowa.

There are a number of minor variations present in the structure of this and the following species. The tip of the upper branch of the cerci of the male is sometimes simply acute and sometimes with the point subapical. The ventral subapical dentical of the lower branch is sometimes obsolete and there is a little variation in the shape of the elytra, of the posterior border of the pronotum and in the distinctness of the transverse sulci of the thorax. Were all these minor points of difference considered the number of species would be undesirably multiplied.

The *C. zimmermanni* of Saussure is placed as a synonym of this species with considerable certainty. The posteriorly angulate pronotum prohibits its being *P. robustus* and the oval elytra of the female indicates its identity with *perspicillatus* rather than with any of the following species. The correctness of this conclusion is also indicated by the pronotum being described as rugose, a condition more obvious in *perspicillatus* than in the other species. The habitat, however, is more southern than common with *concavus* and an examination of the type might show it to belong elsewhere. But according to the only evidence available, that of the printed description, it is most appropriately placed here.

Gryllus perspicillatus of Linnæus, Amœn. Acad. vi, 398 (1763), which has been referred here by Scudder, does not belong to this group at all. It is, so far as I know, an unidentifiable nymph and is referred to by Fabricius in the same work in which the insect now under discussion was described.

C. hypericifolia Stoll, which was described from Surinam, has been referred to the synonomy under *perspicillatus*, but probably erroneously so, as it is scarcely likely that a species from Surinam would extend into our region. However the locality may have been wrongly given in Stoll's description, in which case his species may well be referred here, as the figure or description presents no discordant features.

This species is better known than any other member of the group and yet comparatively little is known of it, except as regards its song. Many writers have written accounts, poetic and otherwise, of the song of the katydid. The number of notes are said to bear a certain relation to the temperature, as previously mentioned.

All that is known of the breeding habits of this species has been previously discussed. Harris, Ins. Inj. to Vegetation, has described the eggs of *Microcentrum* as those of this species. Riley, Missouri Report, v, p. 123, describes the true eggs as follows:

> ".25–.30 inches long, very flat, over thrice as long as wide, pointed at each end, with the edges beveled off or emarginate. They are of a dark slate-color and are thrust into crevices and into the softer parts of bark or of stems. The lower or first inserted end is protected by a dark adhesive substance, which hardens and sometimes extends the whole length of one of the borders; and several eggs are usually pressed close to each other."

Perspicillatus is not a rare insect in certain localities in the vicinity of Washington. On Plummer's Island, Md., some miles above the city, it is one of the many insect musicians which make a night spent there so enjoyable. This island, the site of the club house of the 'Washington Biological Field Club,' is one of the most primitive regions within reach of Washington. On the island are many large chestnut trees and in these trees live the katydids, which, with the aid of numerous other orthopterous musicians, make the August night one long dream of blended melody. A midsummer night spent with congenial spirits in the club house on Plummer's Island is a pleasant experience not easily forgotten.

Cyrtophyllus elongatus, new species.

Very closely allied to the preceding species but usually distinguishable with considerable certainty by the smaller size and especially by the much more elongate elytra of the female. The smaller size and more elongate elytra of the females give them a decidedly more slender appearance than seen in any other species of the group. The elytra are variable in shape, sometimes having the posterior border nearly straight and sometimes quite as convex as the costal margin.

Length, pronotum, male, 5; female, 5–5.75; elytra, male, 33–34; female, 32–38; posterior femora, male, 17–20; female, 19–20.5; subgenital plate, male, 12–13.5; ovipositor 16–18; width, pronotum, male, 5.5; female, 5.5–6; elytra, male, 18–18.5; female, 13.5-16; subgenital plate, male, 2.25–2.5; ovipositor, 3–3.5 mm.

Type number 9135 U. S. National Museum.

Four males, seven females from Pennsylvania, Virginia, Indiana and Texas. Type male and female from Crawford and Fountain Counties, Indiana, August. (W. S. Blatchley.)

This species, as seen from the above mentioned localities, occupies about the same territory as the preceding species, extending however a little further south. But *perspicillatus* will probably be found to occur in the gulf states also.

Mr. D. Clemmons took a male specimen of this species on Piney Branch, D. C. It was stridulating, and he says the notes were sharper and more brisk than those of *perspicillatus*. I have found the females at Falls Church, Virginia, in late October, where they were killed by frost and had dropped to the ground. A female of *perspicillatus* was found under similar circumstances on Plummer's Island by Mr. H. S. Barber on October 17 of last year.

Cyrtophyllus furcatus, new species. (Pl. I, fig. 9.)

Male only known. Practically indistinguishable from *C. perspicillatus* except by the cerci, which are remarkably different. The lower branch is scarcely at all incurved apically and is without a ventral subapical dentical but is armed about the middle on the inner side with a black-tipped branch about as long as that portion of the cercus beyond it. The two branches are also somewhat more divergent.

Length, pronotum, 6; elytra, 37; posterior femora, 21.5; subgenital plate, 17; width, pronotum, 6.5; elytra, 18.5; subgenital plate, 2.75 mm.

Type no. 9136 U. S. National Museum.

One male, West Point, Nebraska.

The very unusual structure of the cerci of this form makes it quite unadvisable to consider it other than a valid species. The color is reddish brown rather than green, but this is evidently due to discoloration as the same is true of some specimens of other species.

Cyrtophyllus intermedius, new species. (Pl. I, figs. 2, 8.)

Somewhat allied to both *perspicillatus* and *elongatus*, to the former by the longer posterior femoræ and more nearly to the latter by the smaller size, the indistinct transverse sulci of pronotum and the narrow elytra of the female. The cerci of the male are different from those of either of the allied species, the lower branch being shorter, with the apical incurved portion about as long as the basal portion, which is thick and uniformly tapering; the cerci between the upper and lower branches is much enlarged, more so than in any other species seen, forming a triangular lobe (Fig. 8). The elytra of the single female specimen seen are peculiar in having the posterior margin, when the elytron is spread, nearly straight, the tip narrowly rounded (Fig. 2). The transverse sulci of the pronotum are shallow and obscure.

Length, pronotum, male, 5; female, 5.5; elytra, male, 34; female, 35.5; posterior femora, male, 21; female, 21.5; subgenital plate, male, 13; ovipositor, 18; width, pronotum, male, 6; female, 6; elytra, male, 18; female, 14; subgenital plate, male, 2.25; ovipositor, 3.25 mm.

Type no. 9137, U. S. National Museum.

One male, Biloxi, Mississippi (Alice Tracy); one female, Wellsboro, Texas (N. Banks), July 18, 1903.

This seems to be a southern species. It appears unquestionably distinct, not being referable to either of the allied species. The female is especially closely allied to some of the females of *C. oblongatus* in which the anal margin of the elytra is less convex than the costal margin. The elytra of this species must be spread to properly exhibit the shape, the straight anal margin not being obvious when the elytra are folded.

Genus LEA, new.

Color green with brown or yellowish tints. Form more elongate than usual in the other United States generæ. Vertex as in *Cyrtophyllus* but the head is narrower. Pronotum about one and one half times as long as the middle width, twice as long as the interior width; lateral lobes one and one half times as long as high and meeting the disk in a distinct angle, forming subpersistent lateral carinæ, the disk somewhat rugose and crossed by two distinct, but not conspicuous, sulci, the posterior one a little behind the middle. Legs about as in *Cyrtophyllus*, all the femoræ and tibiæ spined below and the middle and posterior tibiæ above, the anterior ones unarmed dorsally but, like the rest, is flat, with acute margins. Elytra two and one half times as long as the middle breadth, both margins equally curved, apically broadly rounded, the anterior field with the veins regular and parallel as in *Cyrtophyllus;* wings broad, about as in *Cyrtophyllus*. Supraanal plate, at least of the female, slightly more than twice as long as the middle breadth, apically narrowly rounded. Cerci of the male furcate, the branches round and simple, parallel and subequal in length; of female cylindrical, apically pointed and briefly bifid, forming two minute brief branches: subgenital plate of the male similar to that of the allied genera but is more distinctly furcate apically, the two halves more distinctly separated. Ovipositor essentially as in *Cyrtophyllus*, but curving somewhat more abruptly upwards.

Type *Cyrtophyllus floridensis* Beutenm.

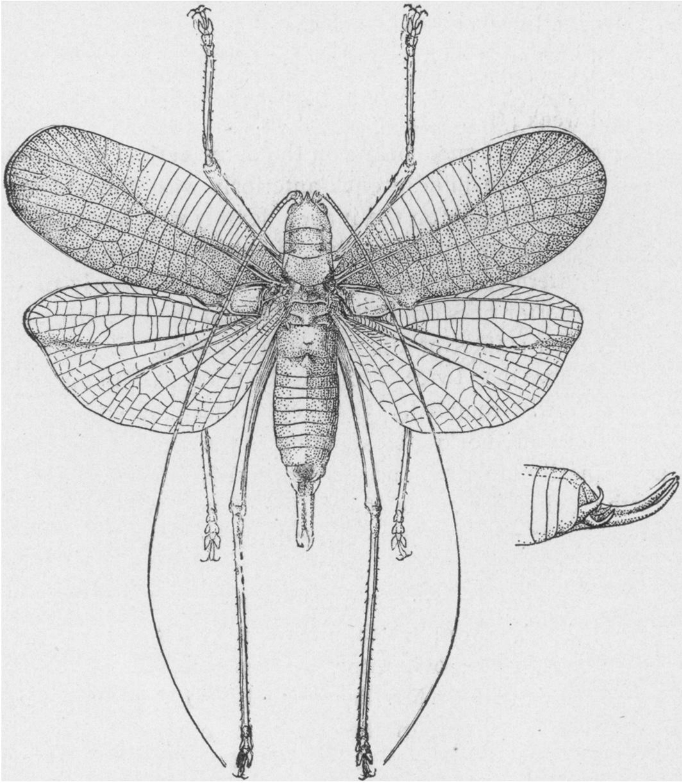
This genus, while related to its allies, has a very distinctive appearance. The elongate pronotum with its subpersistent lateral carinæ and elongate lateral lobes and the generally more elongate form easily distinguish it from the two allied genera. It is much more nearly allied to *Cyrtophyllus* than it is to *Paracyrtophyllus*, as exemplified by the shape of the wings and the dorsally unspined anterior tibiæ; the shape of the cerci of the male however, as shown in the figure, seems to be more like that of *Cyrtophyllus*. All the male characters of the above description were taken from the printed description and figure referred to below. We have but one species:

Lea floridensis Beutenmueller. (Text fig. and Pl. I, fig. 5.)

Cyrtophyllus floridensis Beutenm., Bull. American Mus. Nat. Hist., xix, 637, fig. 3 (1903).

The single male, the type, is the only specimen of that sex known. It is described by the author as follows: "Color — Head and thorax light gray, with a tinge of green. Wing-cases green-gray. Legs greenish, basal half of femora pinkish. Head large, stout; eyes hemispherical, rather small. Vertex with a short spine, rounded at the tip, grooved on top. Antennæ twice as long as the body. Pronotum longer than broad on top, with two transverse furrows; lateral carinæ rounded to the second transverse furrow, thence rather sharply defined to the hind edge; lateral lobes a little narrower at the lower part than at upper; anterior angle acutely rounded; hind angle well rounded. Wings concave. Wing-covers longer than the hind wings, almost three times as long as broad, and almost of equal width; apex rounded. Legs very long, spinulate. Subanal plate very long, curved upwards, grooved above and below, furcate at the tip. Abdomen with a prominent spine on top of the second segment. Stridulating organs similar to those of *Cyrtophyllus perspicillatus*.

Measurements.— Length of body 43 mm. Length of wing-covers, 37 mm.; width, 13 mm. Length of pronotum on top, 8 mm. Length of anterior femora, 17 mm.; middle femora, 15 mm.; posterior femora, 28 mm. Length of anterior tibia, 15 mm.; middle tibia, 14 mm.; posterior tibia, 30 mm.



Lea floridensis Beut. ♂. (After Beutenmüller.)

Habitat. — Indian River (opposite Grant), Florida.

Described from a single male taken in July. Type, coll. Am. Mus. Nat. Hist.

One female from Florida, undated and without specific locality, is before me. It may be described as follows: Color green with head, thorax, legs and part of the elytra more or less yellowish brown, the disk of the pronotum, next the rounded subpersistent lateral carinæ, reddish: when living the insect is probably for the most part green, at least the elytra. Pronotum straight above, roughened, the disk twice as long as the anterior width, crossed at the anterior third by an inconspicuous straight sulcus and just behind the middle with a posteriorly bowed sulcus, a little more distinct than the anterior one (Fig. 5). Elytra equally rounded before and behind, the tip broadly rounded, the whole two and one half times as long as broad, the veins of the anterior field weak; legs moderately stout.

Posterior femora armed below on the outer carinæ with seven or eight spines, and the middle ones anteriorly with five spines; anterior femora armed below on the inner side only with five spines. All the tibiæ armed below with a number of spines on both margins, the posterior and intermediate ones also armed above for nearly the entire length, the posterior ones on both margins and the intermediate ones only on the inner; anterior tibiæ unarmed above. Supraanal plate thin and flat, more than twice as long as the middle width and apically somewhat narrowly rounded. Cerci cylindrical, curving gently inwards and upwards, not quite extending to the tip of the supraanal plate and apically tapering and briefly forked, forming two pointed apical teeth; ovipositor of the general form found in *Cyrtophyllus* but curving somewhat more abruptly upwards, apically serrate below, the serrations very fine.

Length, pronotum, 7.25; anterior femora, 13; hind femora, 25; elytra, 34; ovipositor, 17; width, pronotum, 6; at the anterior margin, 3.25; elytra, 13.5; ovipositor, 3.25 mm.

This species is said by Mr. Beutenmueller to live in the tops of live-oak. He says the note of the male is a continuous "Kerr-kerr-kerr-kerr" with about one second interval of rest. It is not rare on the subtropical strip of land dividing the mainland of eastern Florida from the Ocean. It is not at all allied to the *Cyrtophyllus crepitans* Redt., of the West Indies.

Mr. Rehn has taken a number of this species at Pablo Beach, Fla.

EXPLANATION OF PLATE I.

1. *Paracyrtophyllus robustus* Caud. ♂.
2. *Cyrtophyllus intermedius* Caud. ♀ (elytron).

3. *Cyrtophyllus perspicillatus* Fabr. ♀ (elytron).
4. *Cyrtophyllus perspicillatus* Fabr. ♂ (head and pronotum).
5. *Lea floridensis* Beutenm. ♀ (outline of disk of pronotum from above).
6. *Paracyrtophyllus robustus* Caud. ♂ (cercus, from side).
7. *Cyrtophyllus perspicillatus* Fabr. ♂ (cercus, from side).
8. *Cyrtophyllus intermedius* Caud. ♂ (cercus, from side).
9. *Cyrtophyllus furcatus* Caud. ♂ (cercus, from side).

◆

Class I, HEXAPODA.

Order XIII, MALLOPHAGA.

MALLOPHAGA FROM ARGENTINA.

By Vernon L. Kellogg,

Stanford University, Calif.

(Plate II.)

A small lot of Mallophaga taken from birds of Argentina (South America) was sent me in 1902 by Dr. Carlos Berg, of Buenos Aires. In recently going over this lot I find it to consist of the following nine species, of which seven at least are new and are described and figured herewith.

Eurymetopus taurus Nitzsch.

Several specimens from *Diomedea regia*.

Goniodes sp.?

Two specimens of a large and unusual species of *Goniodes*, without any host reference.

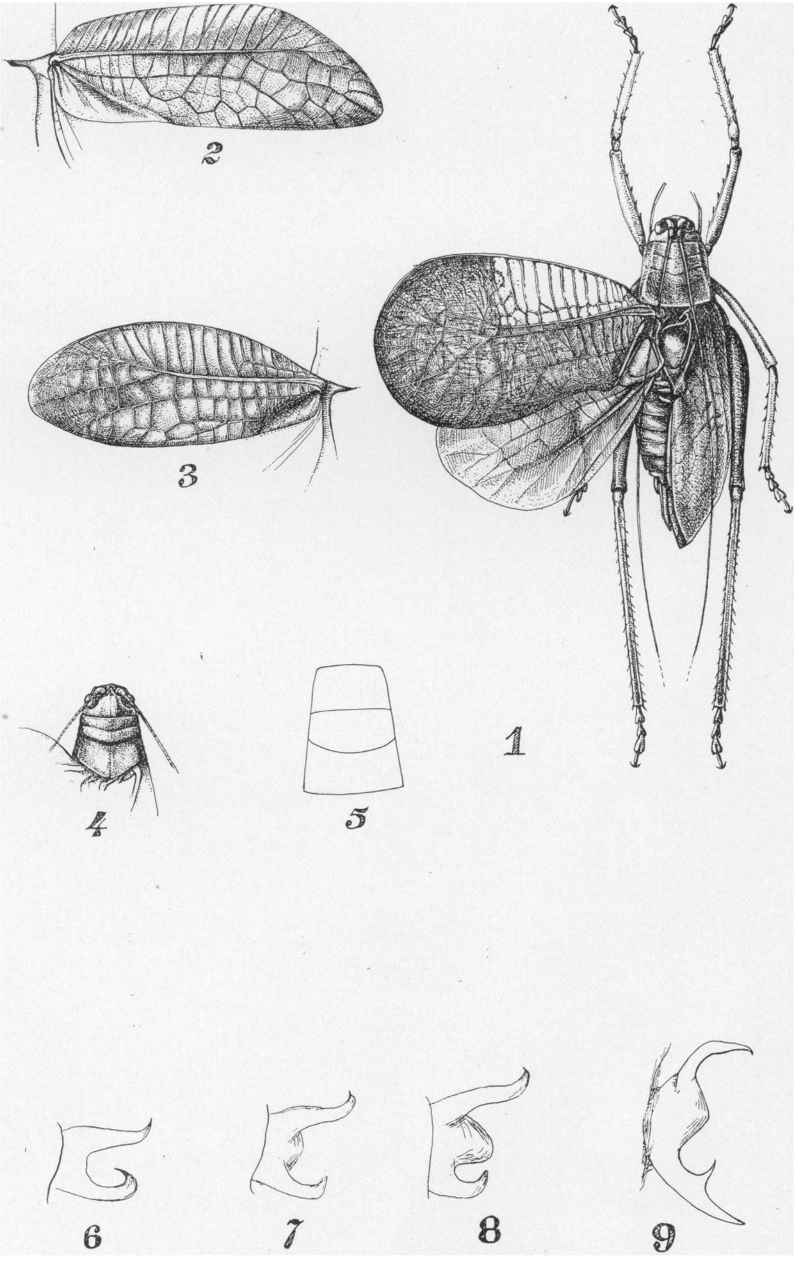
Lipeurus bergi, new species (Pl. ii, Fig. 1).

Males, females and young from *Guira-guira* (Argentina).

Description of Female.—Body, length 2.7 mm., width .55 mm.; slender; strongly marked with light brown regular blotches and bands.

Head, length .55 mm., width .4 mm.; elongate, conical, with rather narrow clypeal front which is very weakly concave; two hairs in anterior angles and other short ones on lateral margins near trabeculæ; trabeculæ colorless; eyes prominent, with black pigment and a prickle; temporal margin convex, with two long hairs and two spines; occipital margin nearly straight, with two spines along posterior angles; signature transparent; ground color pale brown; antennæ and occipital bands brown, temporal margin dark brown, two brown spots along occipital margin between the occipital bands.

Prothorax almost square, with posterior margin very slightly angulated on the metathorax; one long hair on each posterior angle; transparent in middle, with dark



North American Orthoptera.